



Philips Electronics North America Corporation

November 21, 2011

California Energy Commission
Docket Office, MS-4
Re: Docket No. 09-AAER-2
1516 Ninth Street, Mail Station 4
Sacramento, California 95814-5504

DOCKET

09-AAER-2

DATE Nov. 21 2011

RECD. Nov. 21 2011

RE: Docket No. 09-AAER-2

Dear Commissioners:

Philips Electronics sells personal care, consumer electronic, inductively charged tooth brush, exit signs and emergency lighting and medical products (Nebulizers, Portable Oxygen, Automatic External Defibrillators, sleep apnea machines) that use battery chargers. We have provided comments throughout the CEC rulemaking process regarding battery chargers. Philips is a member of AHAM, CEA, NEMA, and the Wireless Power Consortium and we support the comments submitted by those associations.

We appreciate the willingness of staff to engage stakeholders and staff has addressed many of our concerns. These concerns include exempting exit signs, certain types of battery backup products, and Class II and III medical products, establishing a special standard for inductively charged products, establishing a special standard for low wattage battery chargers, and indicating that the regulation would not cover many wireless power products. But we share concerns that our trade associations and others are raising regarding many issues including: flawed cost-benefit analysis, the value of proceeding with a regulation that the DOE battery charger standard will preempt, the inappropriate effective dates for small consumer products, inappropriateness of regulating emergency lighting products, failure to consider usage patterns, the lack of product categorization and problems from the labeling proposal.

Thank you for consideration of our comments. Please let me know if you have any questions concerning them.

Sincerely,

Ric Erdheim

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Senior Counsel

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Emergency Lighting

- A. *The CEC has no data to make the required statutory determinations regarding technical and economic feasibility for emergency lighting products listed under UL standard 924.***

The CEC staff report cites four data sources:

- **Data Source DOE** – The scope of the DOE rulemaking does not cover this product so there is no relevant data regarding emergency lighting from the DOE rulemaking.
- **Data Source CASE Report** – The CASE report only looked at one low end product out of dozens of products addressing a wide variety of environments and applications including parking decks, open air warehouses, classified hazardous locations and manufacturing facilities.

The CASE Report also makes a critical mistake, repeated by the CEC staff report, in focusing on energy used in individual products rather than energy needed to meet code requirements. This focus on products does not appropriately address energy use of emergency lighting. Existing building codes require emergency lighting products to provide a certain amount of light in a specified area. Examining the energy use of any one product simply ignores the existing regulatory requirements that focus on light and area. In previous comments provided to the CEC and which are attached to this document, we provided the CEC with an analysis showing that it would take nine of the emergency lighting products shown in the CASE report to provide the light output that two standard Philips Chloride lights would use. And when you total the energy use of those nine products, it actually exceeds the energy use of the two more typical Philips Chloride products.

In addition, establishing a standard that only allows low end products would wind up increasing the costs to California citizens. The following information demonstrates these additional costs.

Imported units (9 ea)

Unit cost = \$30.00 ea * 9 = \$270.00

Labor = 1 hr ea @ \$85.00/hr = \$765.00

Installation cost = \$1,035.00

Alternative product (2 ea)

Unit cost = \$250.00 ea * 2 = \$500.00

Labor = 1 hr ea @ \$85.00/hr = \$170.00

Installation cost = \$670.00

This initial cost of ownership does not take into consideration the additional j-boxes, pipe and wire associated with the different scenarios where the nine will be less favorable than the two.

So establishing a standard based on energy use per product fails to consider existing regulatory requirements and would increase energy use and increase cost to California consumers, exactly opposite what is required by the Warren-Alquist Act.

We specifically want to address two comments made at the October 24, 2011 public hearing by Suzanne Foster Porter of Ecova.

On page 65 of the transcript Ms. Foster Porter says:

Unlike most lighting applications in California, the majority of energy consumed by egress lighting is to charge a battery that's used for emergency purposes in the event of a power outage. This standard does not impact the type of lighting, the amount of lighting, the quality of light that's used with the emergency egress and only measures the energy use that a battery has used to create the backup system for that light.

- ***This statement is incorrect.*** It ignores the Federal performance requirements and the variety of applications Emergency Lighting products as they are deployed coupled with the various battery chemistries used to accommodate varying ambient temperature conditions that have negative effects on batteries. Despite Ms. Foster Porter's statement the proposed standard does impact the type of lighting because it would preclude certain battery topologies that cannot meet the proposed charging limitations (such as nickel cadmium based products) and, therefore, will leave a significant void of products for certain applications to the facility owners for adequate public safety in facilities including parking decks, open air warehouses, classified hazardous locations and manufacturing facilities. ***The proposed standard would ultimately limit the capacity ratings of emergency lighting equipment, which will result in the availability of products that have inferior light output performance requiring more individual pieces of equipment to provide adequate emergency egress lighting in accordance with the Federal Codes.*** We foresee the net result being more battery charging systems deployed across the state of California with a net result of ***an increase in energy consumption*** to facilitate this increase in products as we discussed above.

On pages 65 and 66 of the transcript Ms. Foster Porter said the following:

The case report—in preparation for the case report, we reported test data from one specific lighting system and investigated the circuitry of others to confirm that the battery charging circuitry found within an emergency egress light is the same type of topology, technology and approach that is used with other battery charger systems found in other parts of the standard; and concluded that the technology from other battery charger systems that have similar topology can transfer to this technology.

The product used for the demonstration of this statement, as found in the CASE report, is at the lowest end of the emergency lighting products with respect to integral battery mass and actual light output performance that can be found in distribution and in no way represents the full scope of such products. It is reasonable to assume that the “other” products reviewed also came from the shelf of local distribution and would be comparable in size and technology deployed. To use these products in accordance with

the prescribed life safety codes would result in having a product installed every four paces along the entire designated path of egress. These products are off-shore goods and are not intended to meet the demands of certain facility needs where abnormal mounting heights, ambient temperature extremes, or even extended run times are deemed necessary based on the facility construction or expected occupancy requires additional durations of emergency egress lighting (think daycare, assisted living or hospital facilities where the movement of the occupants could require a prolonged period of time).

There is nothing in the CASE report that shows that the authors did anything other than a cursory review of low-end emergency lighting and failed to evaluate the full range of products in different types of environments.

- CEC staff report – There is no discussion of applicability of any technologies to emergency lighting. None of these technologies are proven for emergency lighting. Emergency lighting is a pure standby product that is not comparable to any products covered in proposal.

The CASE report recommends the following methods for charger efficiency improvements:

- ✓ **Lowering charging currents:** reduces charge mode and maintenance mode power levels and heating losses.

Philips Response:

- A. The existing charge currents used by Emergency Lighting manufacturers are in place to satisfy the charge/discharge test program in accordance with UL standard 924. Reducing these charge currents can and will result in non-compliant product in accordance with the standard.
 - B. Substantial data was provided to the CEC under confidentiality agreements illustrating a standard product available in the marketplace using nickel cadmium battery technology. This data clearly showed that the base demand of the battery itself, with no other portion of the equipment electronics in play, would easily surpass the proposed charging limitations of this proposal.
- ✓ **Battery sensing circuitry:** reduces no battery mode power, reduces unnecessary overcharge energy usage, improves charge return factor, reduces heat in the battery and can also lengthen battery life.

Philips Response

- A. Backup batteries for Emergency Lighting equipment are required by State, Federal and International codes to always be connected as part of the equipment. To encounter a no battery mode is to be out of compliance with state, federal and international code requirements while leaving building occupants at risk.

- ✓ **Higher internal system voltage:** may reduce resistive and conversion losses, and may also reduce system current (Geist, Kameth et al. 2006).

Philips Response

A. The system voltages for Emergency Lighting equipment are specifically designed for the VDC rating of the battery systems being charged, i.e. 6, 12 or 24 VDC battery backup systems. Increasing the internal system voltage would require additional losses in order to reduce the voltages being delivered to the battery assembly.

- ✓ **Reduced fixed energy consumption:** may reduce no-battery mode power and energy usage overall.

Philips Response

A. Backup batteries for Emergency Lighting equipment is required by State, Federal and International codes to always be connected as part of the equipment. To encounter a no battery mode is to be out of compliance with State, Federal and International code requirements while leaving building occupants at risk.

The arguments made above have been presented previously to the CEC staff but have been ignored. At no time during this proposal process has the CEC or its consultants solicited the certification requirements for Emergency Lighting Equipment as described in the UL standard 924. This is evidenced in the fact that as the regulatory requirements have been presented on prior occasions to the CEC staff, while the reply “why do you keep bringing up the codes” has been the standard answer in return to these comments. Additionally, it has not been made obvious to industry that this proposal has been evaluated to any of the State, Federal or International code models governing Emergency Lighting equipment as it relates to performance of these products in the field for public safety.

- Data Source Philips – Philips supplied confidential data to the CEC. We won’t discuss this data publicly because the CEC has agreed to treat the data as confidential but Philips’ data shows that any theoretically possible changes are not economically feasible.

B. *Without data CEC can’t make necessary findings about feasibility and cost effectiveness required by the statute*

The vast majority of existing emergency lighting does not meet the maintenance mode power standard proposed in the regulations because of inherent performance attributes and battery chemistries used. There is no discussion in any of CEC staff documents or CASE report about feasibility and cost-effectiveness for emergency lighting. As discussed above the charging circuit modifications and/or solutions provided in the staff report have not been shown to be reliable for emergency lighting.

The CEC proposal itself demonstrates that the CEC cannot make necessary findings. The proposal provides manufacturers of non consumer products five years to come into

compliance but provided no explanation for the extra four years given for these products to come into compliance.

Staff has informally told us this will give us time to “figure it out.” Staff has also informally told us that it hasn’t conducted a review of the applicability of the energy efficiency techniques provided in the Staff Report for emergency lighting.

But CEC has to have “figured it out” before adopting a standard because it must make statutory findings required by the Warren-Alquist Act.

C. *Not only is the CEC unable to make the required statutory findings for emergency lighting there is absolutely no reason for the CEC to proceed at this time.*

Unlike most of the other CEC proposed regulated products, the Department of Energy regulation of battery chargers will not cover emergency lighting products. As such any DOE action will not preempt the CEC from issuing its own regulations. This means that the CEC does not face the same time constraints for emergency lighting as it feels it has for other products.

In addition the CEC proposal would not make any regulation effective for five years. So why wouldn’t it make more sense to have the appropriate information to make an intelligent decision rather than adopt a proposal based on inadequate information and hope that it works out over the five year period?

At the March 3 workshop the CEC staff provided information about the cooperative process it had undertaken with the National Electrical Manufacturers Association (NEMA) and its members to address a lighting controls regulation. This is just one of numerous examples of such cooperation between the CEC and NEMA. We believe that if the CEC wants to address emergency lighting it should use a similar process to work with the NEMA Emergency Lighting section in a separate process to address emergency lighting and remove the proposal to regulate emergency lighting from this rulemaking.

D. *Because emergency lighting is a life safety product the CEC should take even greater efforts than with other products to ensure that its regulations will not have an adverse effect on life safety.*

The CEC proposal is unfounded making it is potentially dangerous for occupancy safety. Unlike many if not most of the other products that the staff recommendation would regulate, emergency lighting products are heavily regulated life safety products. As such, the CEC should be overly cautious in proposing a regulation without a thorough understanding of the products and the potential impacts of the proposal on life safety.

The CEC should be held to higher standard for regulating such life safety products than they should for other products because the effects of being wrong are so potentially serious.

E. *Philips also believes that the CEC staff report’s analysis of energy/cost savings is fundamentally flawed.*

Page 66 of the transcript contains the following statement regarding emergency lighting:

This is worth 37 gigawatt hours per year to the California taxpayers. So we encourage you to keep that standard the same.

The CEC has revised the proposed standard originally found in the CASE report by exempting emergency signs (approximately 60% of the emergency lighting market) and uninterruptible power systems that are voltage independent and voltage and frequency independent.

This table comes from the document titled CEC-400-2011-001-SD published in March 2011 (page 46).

Table B-6 Costs and Savings

Product	Unit Cost To Comply	Unit Energy Savings (Kwh/Yr)	Unit Cost Savings	Net Unit Savings	Current Stock Consumption	Stock Energy Savings (Gwh/yr)	Energy Savings Of First Year Sales (Gwh)	Benefit/Cost
Auto/Marine/RV	\$10.00	380.37	\$466.09	\$455.09	328.31	684.67	70.52	46.6
Cell Phones	\$0.00	0.51	\$0.14	\$0.14	166.76	12.29	8.63	N/A
Cordless Phones	\$0.40	14.06	\$9.27	\$8.87	399.00	288.21	40.62	23.2
Personal Audio Electronics	\$0.00	0.52	\$0.21	\$0.21	74.47	1.56	0.62	N/A
Emergency Systems	\$3.00	20.94	\$18.76	\$15.76	134.52	99.86	24.49	6.3
Laptops	\$0.00	17.74	\$9.50	\$9.50	536.34	255.50	94.14	N/A
Personal Care	\$0.40	4.54	\$2.99	\$2.59	78.31	39.50	8.69	7.5
Personal Electric Vehicles	\$2.00	398.81	\$486.68	\$485.68	93.12	35.89	16.94	244.3
Portable Electronics	\$0.00	2.55	\$1.68	\$1.68	43.26	23.63	5.00	N/A
Portable Lighting	\$0.40	9.57	\$11.72	\$11.32	16.77	11.48	0.10	29.3
Power Tools	\$0.55	16.40	\$12.78	\$12.23	357.22	225.79	44.47	23.2
Universal Battery Charger	\$0.00	4.57	\$4.61	\$4.61	7.35	2.06	0.26	N/A
Golf Cart/ Electric Carts	\$200.00	673.92	\$825.79	\$625.79	415.62	58.97	6.64	4.1
Emergency Backup Lighting	\$3.00	9.61	\$11.77	\$8.77	110.53	37.95	9.61	3.9
Handheld Barcode Scanners	\$0.50	20.18	\$20.37	\$19.87	63.83	24.22	4.06	40.7
Two-Way Radios	\$0.50	11.80	\$11.91	\$11.41	10.85	3.54	0.17	23.8
Single Phase Lift-Trucks	\$200.00	\$1,105.64	\$1,892.29	\$1,692.29	236.91	32.06	2.37	9.5
Three Phase Lift Trucks	\$400.00	\$4,198.51	\$7,185.73	\$6,785.73	3,554.81	310.69	22.46	18.0

This table comes from the document titled CEC-400-2011-001-SF posted in October of 2011 (page 39)

Table A-7: Costs and Savings

Product	Unit Incremental Cost Increase	Unit Energy Savings (Kwh/yr)	Unit Cost Savings	Net Unit Savings	Stock Energy Savings (Gwh/yr)	Energy Savings Of First Year Sales (Gwh)	Benefit/Cost
Auto/Marine/RV	\$10.00	313.91	\$384.65	\$374.65	656.07	63.6	38.5
Cell Phones	\$0.00	0.45	\$0.12	\$0.12	2.67	1.88	N/A
Cordless Phones	\$0.40	13.40	\$8.84	\$8.44	178.26	28.86	22.1
Personal Audio Electronics	\$0.00	0.49	\$0.20	\$0.20	1.56	0.68	N/A
Emergency Systems	\$3.00	15.87	\$14.22	\$11.22	77.14	18.57	4.7
Laptops	\$0.50	16.82	\$9.00	\$8.50	369.36	144.41	18
Personal Care	\$0.40	1.81	\$1.19	\$0.79	17.54	3.83	3
Personal Electric Vehicles	\$12.00	536.83	\$657.81	\$645.81	106.29	41.38	54.8
Portable Electronics	\$0.40	1.71	\$1.13	\$0.73	28.22	5.10	2.8
Portable Lighting	\$0.40	8.62	\$10.56	\$10.16	10.34	0.99	26.4
Power Tools	\$0.55	14.95	\$11.65	\$11.10	250.30	46.94	21.2
Universal Battery Charger	\$0.40	3.93	\$3.96	\$3.56	1.96	0.24	9.9
Golf Cart/ Electric Carts	\$200.00	807.61	\$989.61	\$789.61	100.14	13.39	4.9
Emergency Backup Lighting	\$3.00	8.56	\$10.48	\$7.48	33.58	8.56	3.5
Handheld Barcode Scanners	\$0.50	19.68	\$19.86	\$19.36	3.15	0.25	39.7
Two-Way Radios	\$0.50	8.86	\$8.94	\$8.44	2.66	0.31	17.9
Single Phase Lift-Trucks	\$200.00	1,032.64	\$1,767.36	\$1,567.36	30.77	2.41	9.5
Three Phase Lift Trucks	\$400.00	4,198.51	\$7,185.73	\$6,785.73	316.57	24.52	18.0

For every category listed, it should be noted that, with the exception of the incremental cost increase column, that all associated savings tabulations have been altered since the October 2010 CASE report.

But it is clear that the cost and savings calculations published by the CEC in October, 2011, do not reflect the removal of the technologies that have been excluded from the proposed requirements. Emergency signs alone reduce the scope of the proposal by 60% and the CEC has further exempted the VI and VFI products. The net result of the categorical reduction of Emergency Lighting equipment through exemptions will have a dramatic effect, in the form of a substantial reduction to the savings calculation used to provide feasibility for this product category.

The lack of accurate cost and savings data makes it impossible for the CEC to make its required findings regarding the benefit to the consumer.

F. The CEC regulations use incorrect terms to describe emergency lighting and are very confusing.

First, the scope section contains the following statement:

1. Emergency lighting, which is illuminated exit signs and self-contained lighting controls.

This statement has two flaws that make it very confusing.

First, emergency lighting is not illuminated exit signs.

It should also be made known that Emergency Lighting, as a collective group, includes any product covered under the scope of, and listed to, UL standard 924, the standard for Emergency Lighting and Power Equipment. There are no other product definitions or categories for which these products can be placed or described. They are unique to any other lighting technology and are the only federally mandated lighting products described in all relevant State, National, and International code models.

The collective group of product technologies covered under the scope of UL standard 924 include, but are not limited to:

- ✓ Emergency luminaires
- ✓ Exit Signs
- ✓ Unit Equipment
- ✓ Inverters
- ✓ Central Station Battery Systems

The current proposed language does not give adequate recognition to the individual equipment categories under the header Emergency Lighting as found in the CEC proposal; all of which contain battery chargers. By not understanding the product categories you are addressing, the CEC does not appear to understand the overall ramifications of its proposal to industry or to facilities that require this equipment for public safety.

Second, the merging of emergency lighting and self-contained lighting controls is an inappropriate combination of technologies as there are no synergies between Emergency Lighting products and self-contained Lighting controls. Additionally, the definitions that follow this header do not include any language of which would define Emergency Lighting equipment.

G. Exempting emergency lighting is consistent with other regulations.

We also note that the concept of excluding life safety products from such regulations is hardly a radical suggestion. Last year the Congress passed legislation that would exempt security or life safety alarm or surveillance systems from Federal external power supply regulations.

We urge the CEC to exempt emergency lighting products from this regulation because the case report has failed to consider existing building code requirements for emergency lighting products and the CEC record is devoid of any background information that the CEC needs to make the necessary Warren-Alquist findings for emergency lighting.

At the very least the CEC should remove emergency lighting from this rulemaking and establish a separate process to determine whether establishing a standard for emergency lighting can be done consistent with the requirements of the Warren-Alquist Act.

Wireless Power

Philips and CEC staffs have discussed how the proposed regulations would apply to wireless power. We understand that the CEC position is that qi compliant base stations were not battery chargers, and that end unit receivers were not battery chargers and would not be

included within the scope of the proposed rules. So charging system elements, such as a base station, would be outside the scope of the standard and **only** if a manufacturer were to make available on the market a complete charging system; including the base station and the receiver in a single package, would it be included with the scope of the proposed rules and subject to the testing requirement for efficiency. We request that the CEC confirm this interpretation.

In addition since it makes sense to have a single standard for products using the Qi standard, we recommend that the CEC exempt these products from this rulemaking and instead address wireless power standards for all products, battery chargers and non battery chargers, in the next round of CEC rulemakings.

Inductive Power Tooth Brush Test Procedure

We have a question about the statement on p25 of the October 2011 staff report that sets forth the CEC energy consumption limits. It states that for inductive chargers the limit for active charge mode is **‘an average of less than 1 watt over a 24 hour test period’**. In the DOE test procedure on p31780 it states that **‘if the full-charge indication is not yet present after 19 hours of charging, the test shall continue until 5 hours after the indication is present.’** Consequently, the test period could last more than 24hours. It seems that the staff report is not totally aligned with the DOE test procedure and this could cause confusion as to how to take the active energy consumption measurement.

Proposed change: ‘an average of less than 1 watt over the test period as described in the test procedure DOE 10 CFR Part 430 section 5.2 Determining the Duration of the Charge and Maintenance Mode Test’ or something to that effect.

Usage Patterns

We continue to raise our concern that the CEC needs to consider that many products are infrequently charged and as a result have little power for energy savings resulting in an unfavorable payback period. The Department of Energy has developed proposed usage patterns for close to sixty products with battery chargers. According to DOE data eighteen of these products are plugged into the mains on average 1 hour or less a day. Another eight are plugged into the mains on average less than half a day and only nineteen are plugged in all the time.

The CASE study, however, would propose to regulate infrequently charged products to the same extent as continuously charged products. The CEC staff report continues to quote an old study that says personal grooming products are connected to the mains 100% of the time. This makes no sense. ECOS staff says that data does not exist to distinguish these products. In other words, its proposed approach is to have the CEC stick its head in the sand and ignore common sense and existing DOE data.

Philips continues to urge the CEC to treat infrequently charged products in a separate class or classes to reflect the lack of energy savings potential for these products and the resulting long payback to increase the efficiency of these products.

Product Categories

During the workshop I raised the issue that the CEC staff proposal arbitrarily and inappropriately lumps almost all small products together in one product category notwithstanding the differences in the products. On page 9 of the CEC Staff Report the CEC contrasts the CEC's proposed three categories to the draft DOE ten category system. But this comparison is highly misleading. One of the three CEC proposed categories is large non consumer products not addressed by the DOE. A second category, inductive charge, is found in both the DOE and CEC proposals. While the DOE proposed eight to nine categories to regulate non inductively charged small consumer products, and AHAM and Philips argued that even this was not adequate, the CEC proposes one category for all non inductively charged consumer products. Such a lumping of such a wide variety of products with extensive differences results in averaging that will have an unacceptable affect on certain products. A person can drown in a river with an average depth of one foot if they are in the part of the river where the depth is ten feet. We urge the CEC to group products into appropriate categories, not just lump all small non inductive products into one category.

Labeling

The CEC proposes to require labeling of products with battery chargers even as it acknowledges that the US DOE is expected to regulate consumer battery chargers and the DOE is under a Congressional mandate to act. As part of this regulation the DOE could propose labeling for battery chargers. If the DOE acts, the CEC energy standards and labeling requirements would be for those regulated products.

If the DOE labeling is not exactly the same as the CEC labeling then manufacturers would have to change labeling twice, once to comply with CEC regulations and then to comply with DOE regulations. This adds costs and provides no value.

There is no way to know what the DOE will do because it is required under law to go through notice and comment rulemaking and respond to all comments. Even when the DOE regulates battery chargers if it does not require labeling the CEC cannot require labeling to show compliance with its own preempted standards.

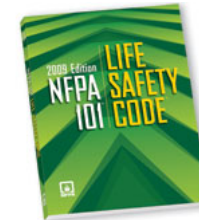
We all faced this exact situation recently with regard to CEC regulations addressing the energy efficiency of televisions. As part of this regulation the CEC required television labeling at the same time the Federal Trade Commission was working on a Federal labeling standard. The legislature passed and the Governor signed a bill effectively staying the CEC labeling as long as the FTC acted in a certain time frame, which it did.

The CEC proposal on labeling in the face of the upcoming DOE regulatory action of battery chargers seems to show that the CEC learned nothing from the television labeling experience.

We would urge the CEC to eliminate the labeling proposal or stay its effectiveness unless it becomes clear that the DOE will not act to regulate the energy efficiency of battery chargers.

Illumination Requirements

The as-installed performance of emergency lighting unit equipment is harmonized between NFPA 101, Life Safety Code and the International Building Code, IBC. System performance is laid out per the following to provide adequate emergency illumination for public safety:



Reference NFPA 101, sec 7.9 *Emergency Lighting*.

7.9.2.1 ...average of one foot-candle, no point less than .1, degradation to 60%, max-to-min uniformity of 40-1.

Reference IBC, sec 1006 *Means of Egress Illumination*.

1006.4 ... average of one foot-candle, no point less than .1, degradation to 60%, max-to-min uniformity of 40-1.

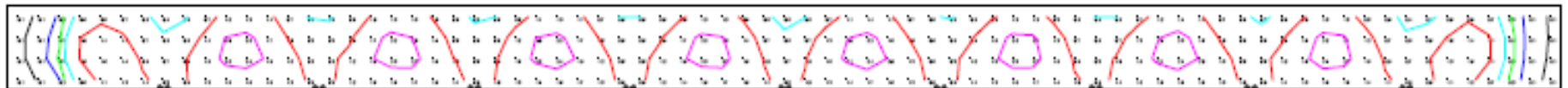
Additionally, current trends indicate that model State Building codes use a version of the IBC (a version meaning dated issue) as well as a version of the National Electrical Code both with amendments to govern the performance of the required public safety equipment

Performance

Anybody's imported, twin-head, thermoplastic emergency lighting fixture.

Nine (9) fixtures, surface wall mount, 7.5' AFF, 150 x 8' corridor

- Average 1.11 fc
- Max 2.4
- Min 0.1
- Average/min ratio 11.1
- Max/min ratio 24



This 150' corridor would require the use of 9 pieces of equipment to meet the minimum performance requirements of code

CHLORIDE

Performance

Alternative product solution – Unit rated 12 VDC, 72-watts for 90-minutes

Two fixtures, recessed ceiling mount, 10' AFF, 150 x 8' corridor

- Average 1.55 fc
- Max 3.9
- Min 0.3
- Average/min ratio 5.17
- Max/min ratio 13



Alternate product solution to illuminate the same corridor but with improved illumination performance; higher average and lower min/max

CHLORIDE

Performance – To Maintain Stored Energy in the Battery Energy Required to Float the Battery Only

Imported product characteristics:

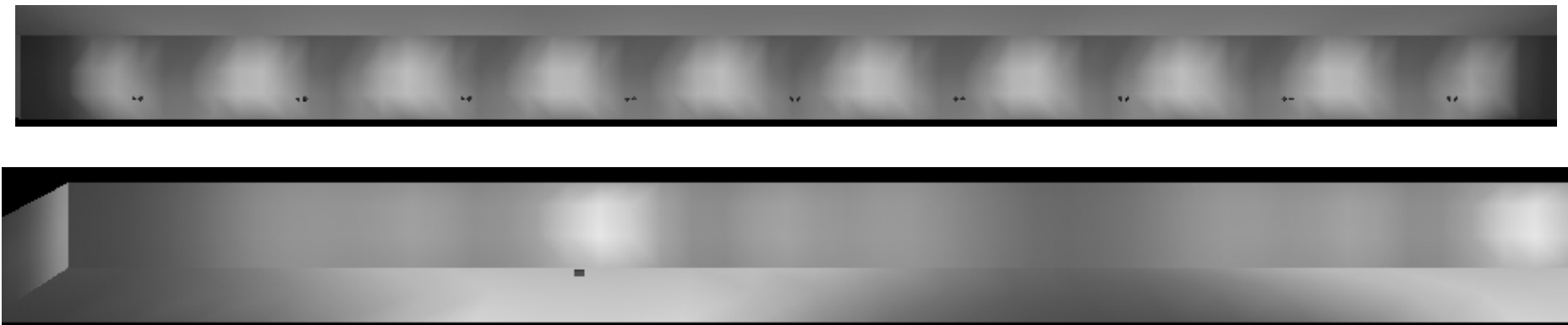
DC Current to battery in maintenance mode (float) =
6.75 VDC, 0.025 A = ~ 0.169 VA

$0.169 \times 9 \text{ units} = 1.521 \text{ VA}$

Alternate product characteristics:

DC Current to battery in maintenance mode (float) =
13.5 VDC, 0.025 A = ~ 0.338 VA

$0.338 \times 2 \text{ units} = 0.675 \text{ VA}$



This study illustrates the energy demand at the battery level ONLY and does not indicate total power consumption of the equipment to retain capacity requirements for systems performance of a minimum 90-minute run time under emergency power. Energy savings does not lie only with individual fixture performance. Total deployment of your life safety products can and will make a difference.

CHLORIDE